Space Weather Forecast

Issued on Saturday, 01 July 2023 at 13:24 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Isolated Minor/Moderate R1/R2 Radio Blackouts likely. Chance of G1 Geomagnetic Storm intervals 01 Jul.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low over the past 24 hours, with X-ray activity showing occasional low-level Common-class flares, the largest of which originated from the largest and most magnetically complex sunspot group on the visible side of the Sun, in the northwest quadrant. This group has shown some spreading in the period, with a tendency for a slight overall decrease in area, although it remains significant, with the potential for notable flares. This was one of nine sunspot regions on the Earth-facing side of the Sun. The remaining sunspots are all considerably smaller, weaker and magnetically simple.

No Earth directed Coronal Mass Ejections (CMEs) have been visible in available imagery.

Solar Wind / Geomagnetic Activity: The solar wind indicates a weak connection to a small coronal hole feature in the southwest quadrant. The solar wind speed was initially at Elevated levels between 500-550km/s in general, but with a peak of 592 km/s at 30/1406 UTC, then very slowly declining to 480km/s (Slightly Elevated) by the end of the period. The associated magnetic field was weak throughout, while the important north-south component also varied weakly, and mainly southward until early afternoon on 30 Jun and mainly northward thereafter. The net effect of the above solar wind measures was for Quiet to Unsettled geomagnetic activity (Kp 0-3).

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Mainly Low activity is expected, but likely increasing to Moderate levels at times with isolated Moderate-class flares. This risk is almost entirely from the large sunspot in the northwest at first, but may be enhanced by new or returning regions through the forecast period.

Solar Wind / Geomagnetic Activity: A CME which left the northeast quadrant of the Sun on 27 Jun may glance Earth on day 1 (01 Jul), or perhaps early day 2 (02 Jul), but this is rather low confidence. A CME associated with the Moderate class flare on the 29 Jun may affect Earth as a glancing blow on day 4 (04 Jul).

In the absence of any CME activity, the current slightly elevated fast wind from a coronal hole in the southwest should slowly decline in the coming days. A connection to a small coronal hole near centre disc in the southern hemisphere may occur on day 4 (4 Jul), however, any enhancements from this are expected to be weak, though may combine with the 29 Jun CME.

Predominantly Quiet (Kp 0-2) geomagnetic activity is expected through the period, with activity likely increasing to Unsettled (Kp 3) or Active (Kp 4) with any CME or high-speed stream arrivals. There is a slight chance of isolated G1/Minor Storm intervals on day 1 and day 4 for CME or combined CME and high-speed stream effects.

Energetic Particles / Solar Radiation: Solar radiation storms are not expected in the period

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and levels of protons are most likely to remain at Background levels. There remains a daily slight chance of reaching the S1/Minor Storm level, mainly due to the large sunspot region in the northwest.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	5	1	20
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	60	60	40	40
Very Active	R3 to R5 X	No	10	10	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	10	10
Very Active	≥ S3 *	No	1	1	1	1

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